FIG. 1

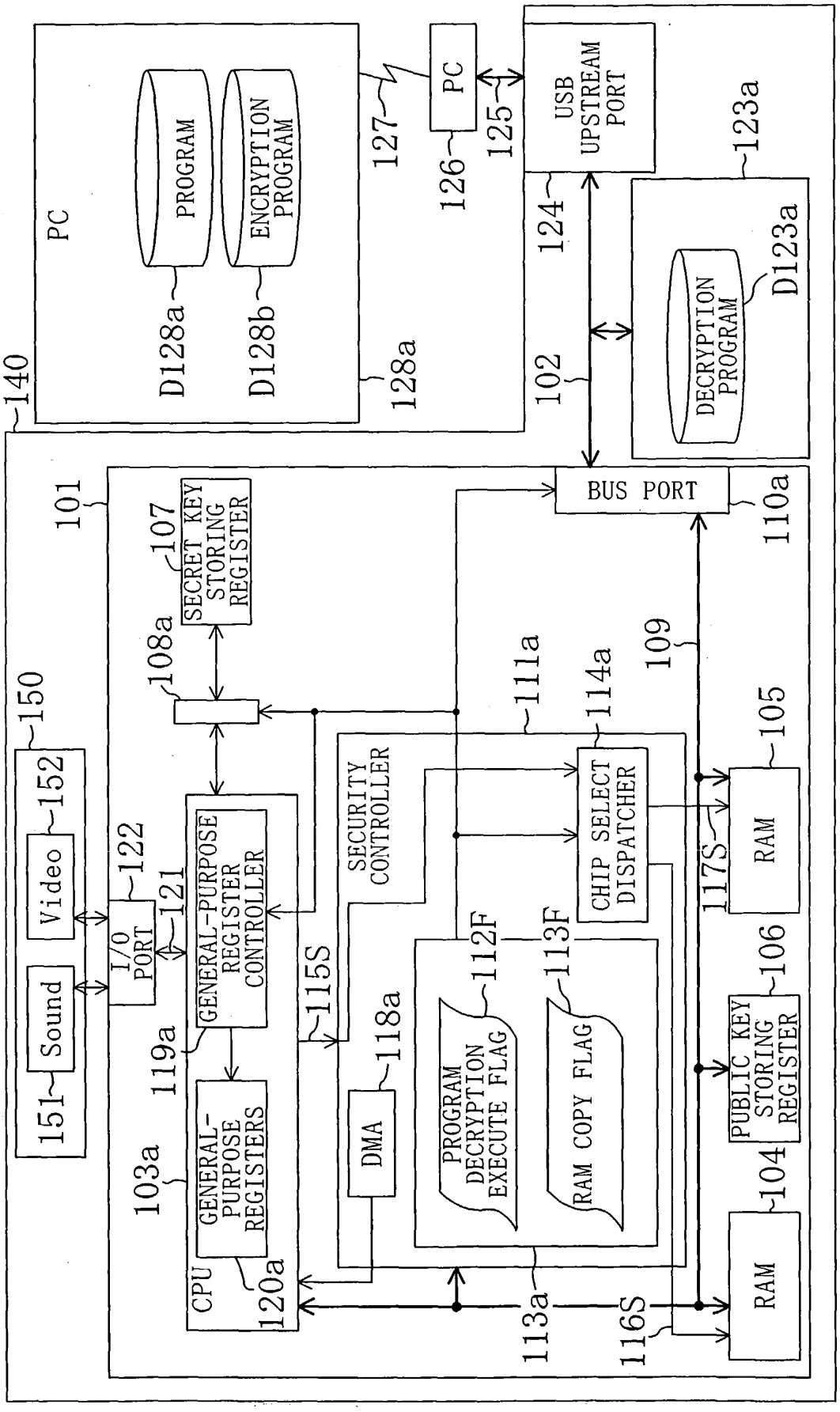
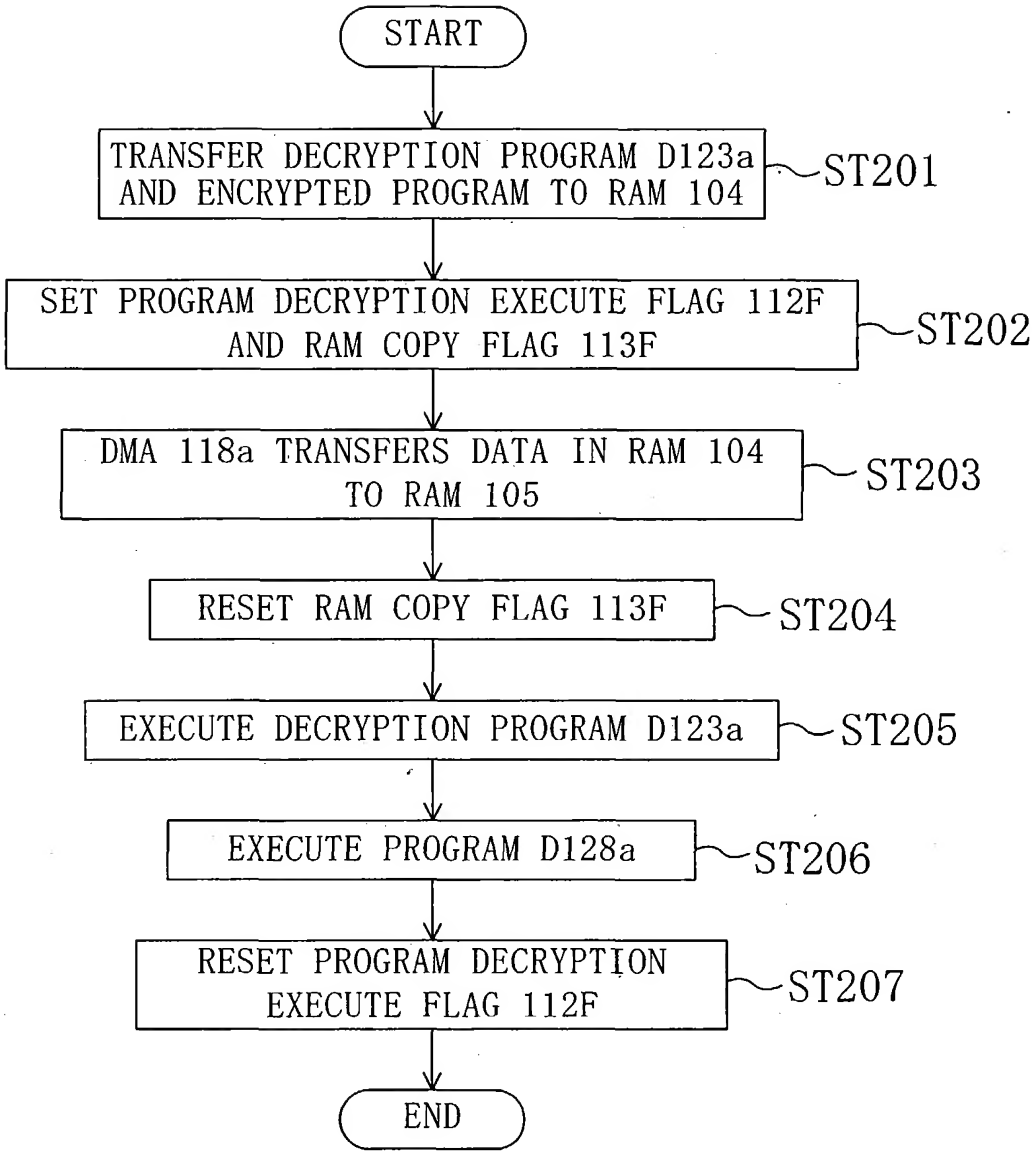

140
PC
PROGRAM
ENCRYPTION PROGRAM
D128a
D128b
128a
127
PC
126
125
USB UPSTREAM PORT
124
102
123a
DECRYPTION PROGRAM
D123a
101
BUS PORT
110a
107
SECRET KEY STORING REGISTER
108a
150
111a
114a
109
152
Video
122
121
I/O PORT
SECURITY CONTROLLER
CHIP SELECT DISPATCHER
105
RAM
117S
151
Sound
GENERAL-PURPOSE REGISTER CONTROLLER
115S
112F
113F
106
PUBLIC KEY STORING REGISTER
119a
103a
GENERAL-PURPOSE REGISTERS
DMA
118a
PROGRAM DECRYPTION EXECUTE FLAG
RAM COPY FLAG
CPU
120a
113a
116S
RAM
104

FIG. 2


START
TRANSFER DECRYPTION PROGRAM D123a AND ENCRYPTED PROGRAM TO RAM 104
ST201
SET PROGRAM DECRYPTION EXECUTE FLAG 112F AND RAM COPY FLAG 113F
ST202
DMA 118a TRANSFERS DATA IN RAM 104 TO RAM 105
ST203
RESET RAM COPY FLAG 113F
ST204
EXECUTE DECRYPTION PROGRAM D123a
ST205
EXECUTE PROGRAM D128a
ST206
RESET PROGRAM DECRYPTION EXECUTE FLAG 112F
ST207
END

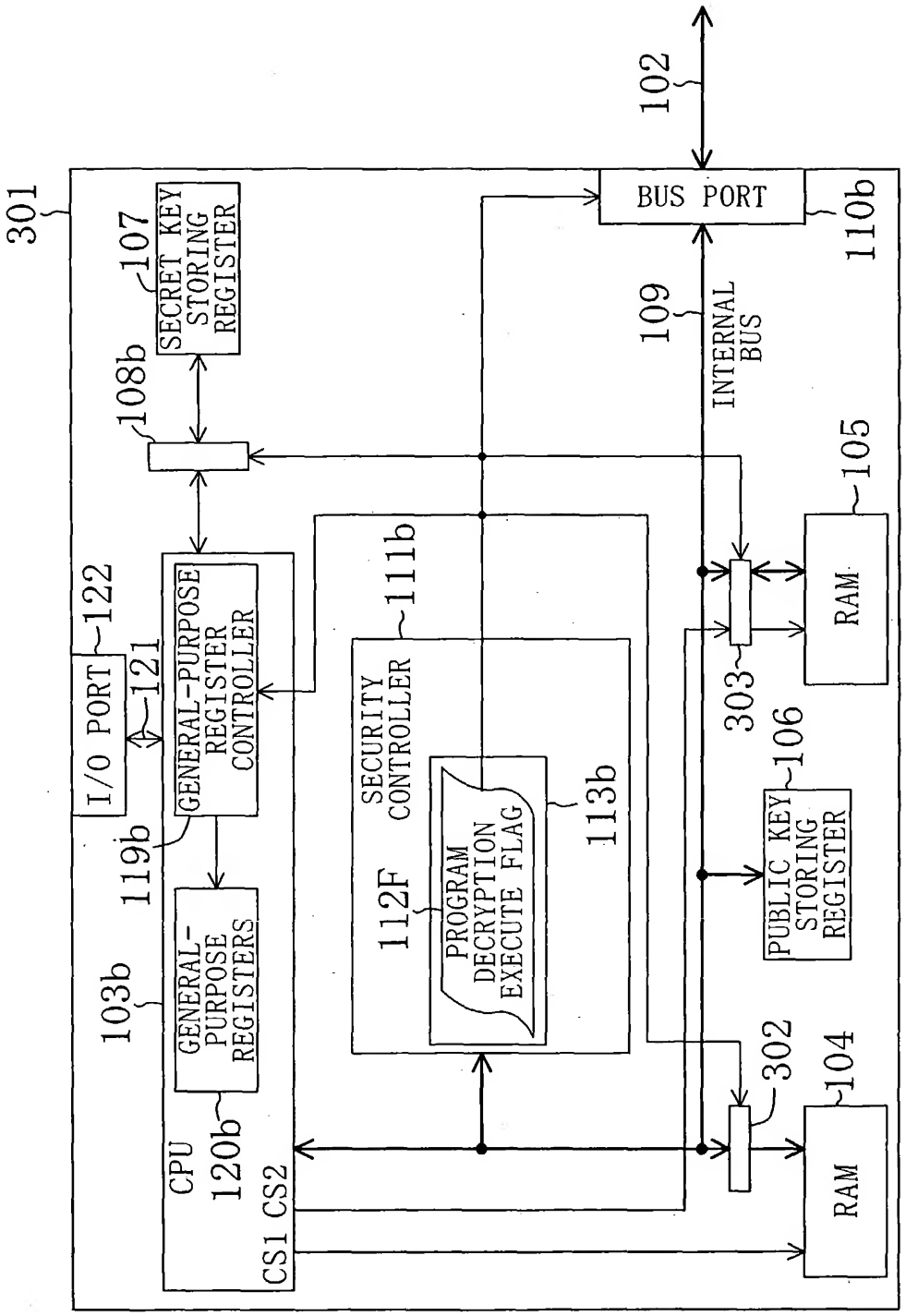

301
102
BUS PORT
110b
107
SECRET KEY STORING REGISTER
109
INTERNAL BUS
108b
105
RAM
122
I/O PORT
121
GENERAL-PURPOSE REGISTER CONTROLLER
111b
SECURITY CONTROLLER
303
106
PUBLIC KEY STORING REGISTER
119b
112F
PROGRAM DECRYPTION EXECUTE FLAG
113b
103b
GENERAL-PURPOSE REGISTERS
302
104
CPU
120b
CS1 CS2
RAM

FIG. 3

FIG. 4

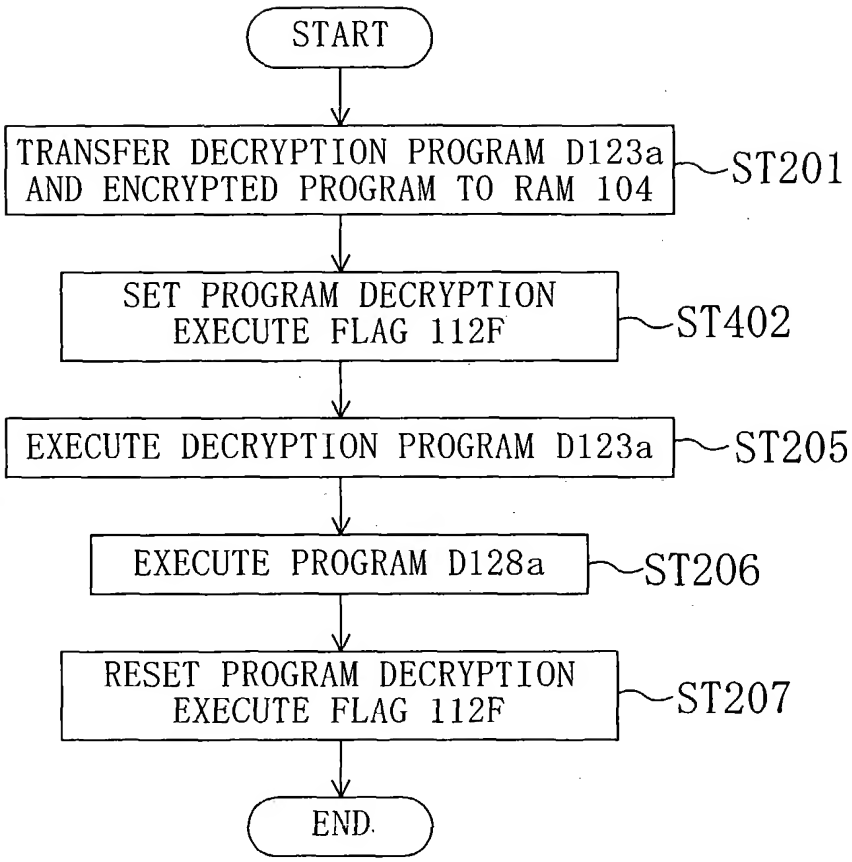

START
TRANSFER DECRYPTION PROGRAM D123a AND ENCRYPTED PROGRAM TO RAM 104
ST201
SET PROGRAM DECRYPTION EXECUTE FLAG 112F
ST402
EXECUTE DECRYPTION PROGRAM D123a
ST205
EXECUTE PROGRAM D128a
ST206
RESET PROGRAM DECRYPTION EXECUTE FLAG 112F
ST207
END

FIG. 5

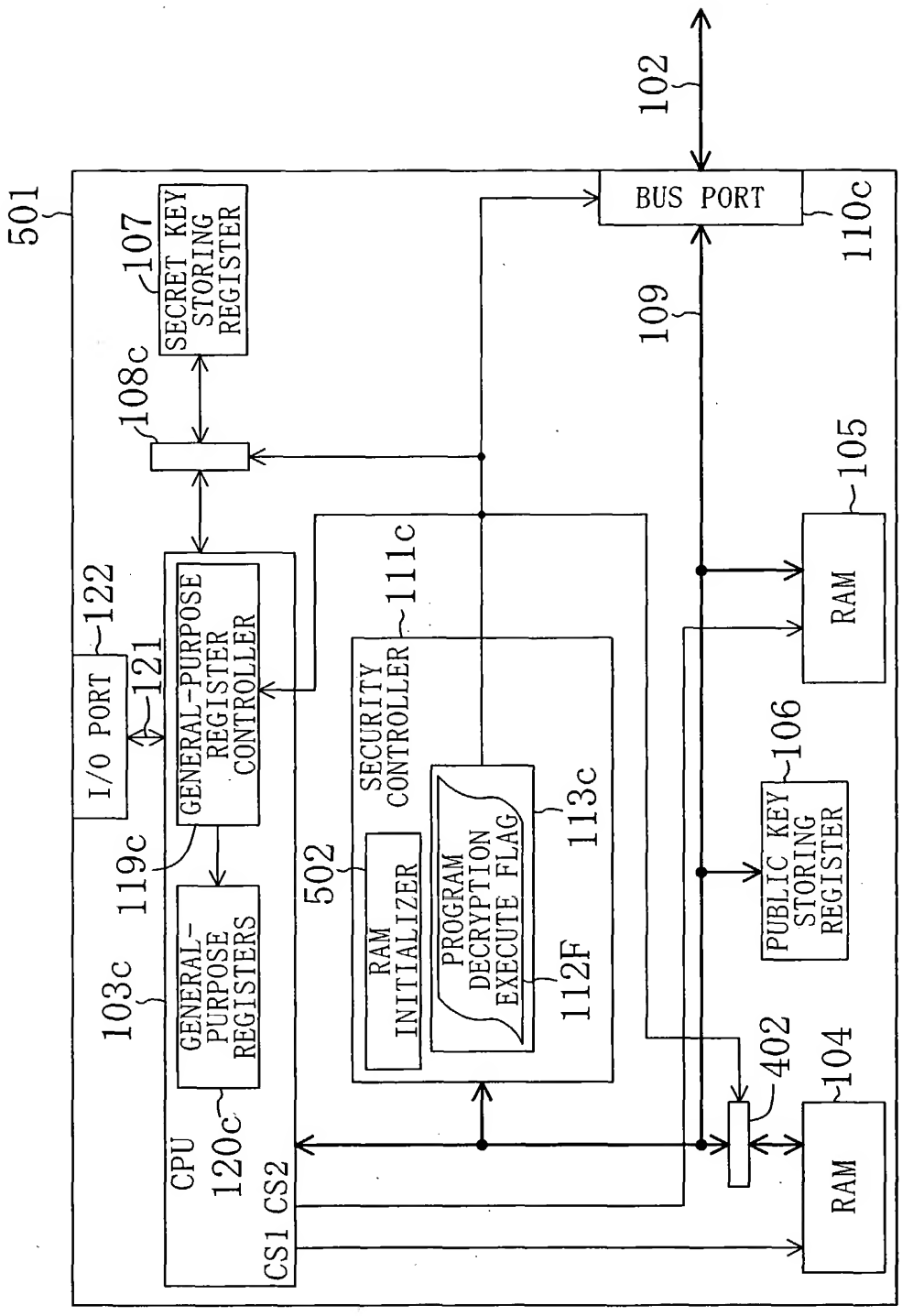

501
102
BUS PORT
110c
109
107
SECRET KEY STORING REGISTER
108c
105
RAM
122
I/O PORT
121
GENERAL-PURPOSE REGISTER CONTROLLER
111c
SECURITY CONTROLLER
106
PUBLIC KEY STORING REGISTER
119c
103c
GENERAL-PURPOSE REGISTERS
502
RAM INITIALIZER
PROGRAM DECRYPTION EXECUTE FLAG
113c
112F
402
104
RAM
CPU
120c
CS1 CS2

FIG. 6

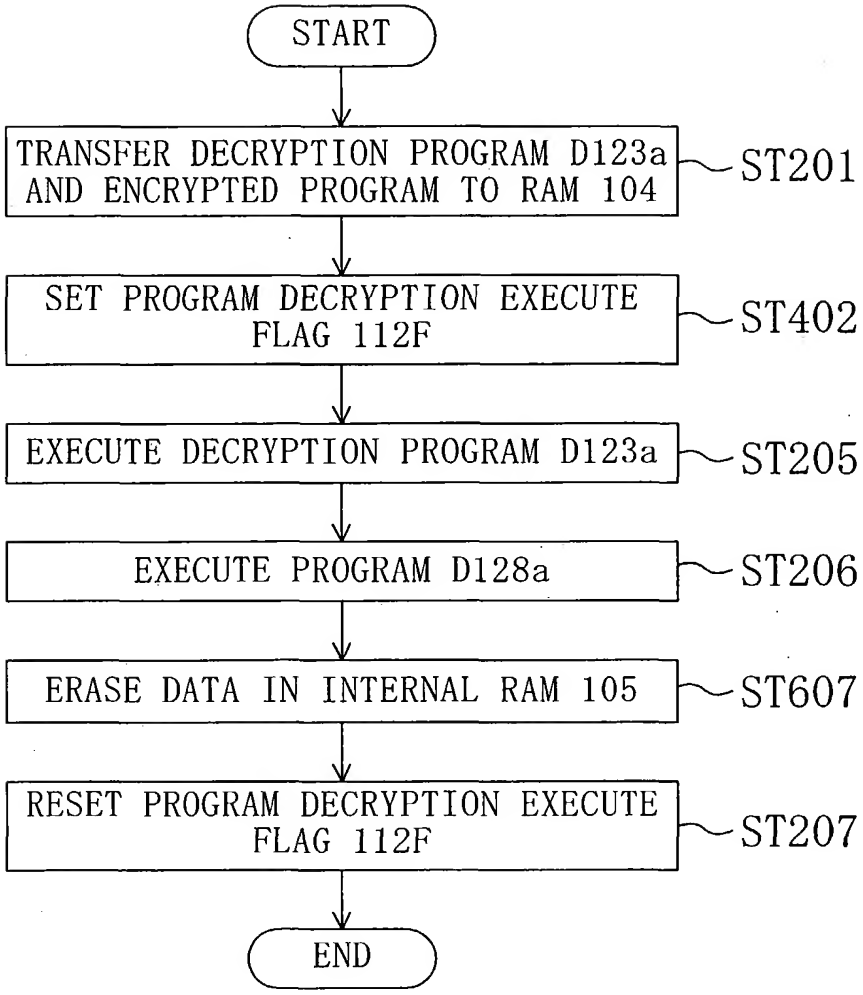

START
TRANSFER DECRYPTION PROGRAM D123a AND ENCRYPTED PROGRAM TO RAM 104
ST201
SET PROGRAM DECRYPTION EXECUTE FLAG 112F
ST402
EXECUTE DECRYPTION PROGRAM D123a
ST205
EXECUTE PROGRAM D128a
ST206
ERASE DATA IN INTERNAL RAM 105
ST607
RESET PROGRAM DECRYPTION EXECUTE FLAG 112F
ST207
END

FIG. 7

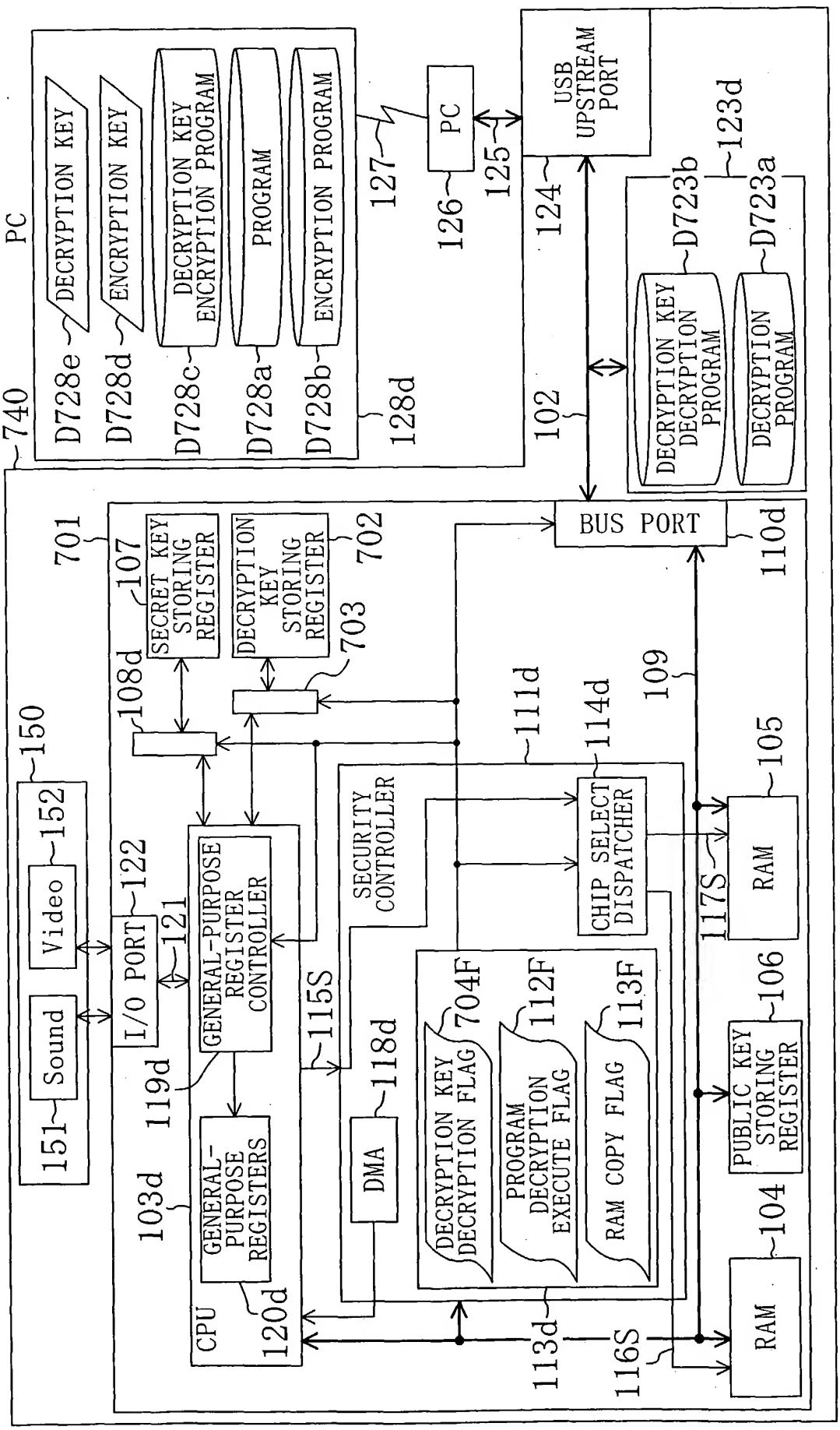

740
PC
D728e
DECRYPTION KEY
D728d
ENCRYPTION KEY
D728c
DECRYPTION KEY ENCRYPTION PROGRAM
D728a
PROGRAM
D728b
ENCRYPTION PROGRAM
128d
127
PC
126
125
USB UPSTREAM PORT
124
102
D723b
DECRYPTION KEY DECRYPTION PROGRAM
D723a
DECRYPTION PROGRAM
123d
701
107
SECRET KEY STORING REGISTER
DECRYPTION KEY STORING REGISTER
702
703
108d
BUS PORT
110d
150
Video
152
Sound
151
I/O PORT
122
121
119d
GENERAL-PURPOSE REGISTER CONTROLLER
103d
GENERAL-PURPOSE REGISTERS
CPU
120d
115S
SECURITY CONTROLLER
DMA
118d
111d
114d
109
CHIP SELECT DISPATCHER
DECRYPTION KEY DECRYPTION FLAG
704F
PROGRAM DECRYPTION EXECUTE FLAG
112F
RAM COPY FLAG
113F
117S
RAM
105
PUBLIC KEY STORING REGISTER
106
RAM
104
113d
116S

FIG. 8

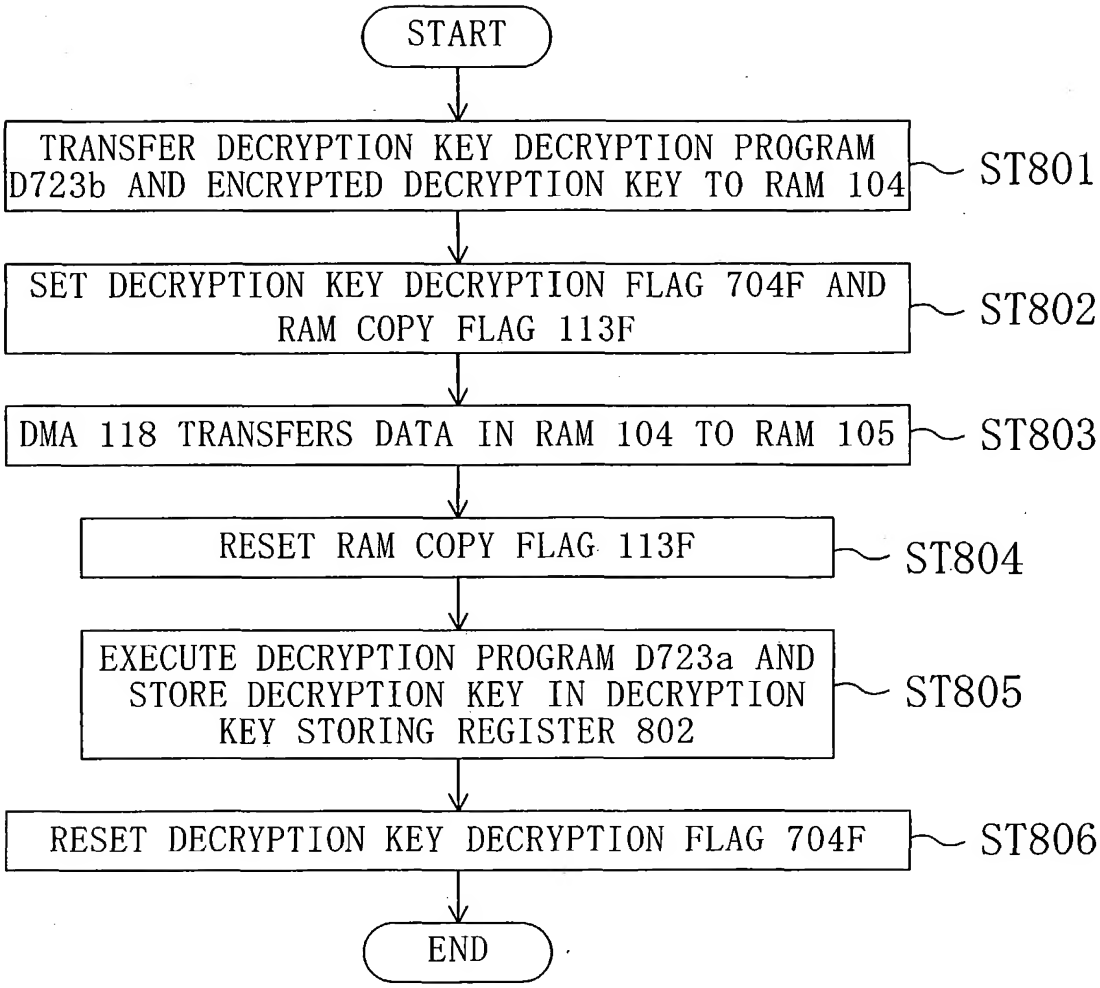

START
TRANSFER DECRYPTION KEY DECRYPTION PROGRAM D723b AND ENCRYPTED DECRYPTION KEY TO RAM 104
ST801
SET DECRYPTION KEY DECRYPTION FLAG 704F AND RAM COPY FLAG 113F
ST802
DMA 118 TRANSFERS DATA IN RAM 104 TO RAM 105
ST803
RESET RAM COPY FLAG 113F
ST804
EXECUTE DECRYPTION PROGRAM D723a AND STORE DECRYPTION KEY IN DECRYPTION KEY STORING REGISTER 802
ST805
RESET DECRYPTION KEY DECRYPTION FLAG 704F
ST806
END

FIG. 9

| | | | | | |
|---|---|---|---|---|---|
| RAM COPY FLAG 113F | 0 | 1 | 0 | 1 | 0 |
| DECRYPTION KEY DECRYPTION FLAG 704F | 0 | 1 | 1 | 0 | 0 |
| PROGRAM DECRYPTION EXECUTE FLAG 112F | 0 | 0 | 0 | 1 | 1 |
| BUS PORT 110d | OPEN | CLOSE | CLOSE | CLOSE | CLOSE |
| SECRET KEY ACCESS PORT 108d | CLOSE | CLOSE | OPEN | CLOSE | CLOSE |
| DECRYPTION KEY ACCESS PORT 703 | CLOSE | CLOSE | OPEN | CLOSE | OPEN |
| CHIP SELECT SIGNAL 116S | CS115 | ASSERT | NEGATE | ASSERT | NEGATE |
| CHIP SELECT SIGNAL 117S | NEGATE | ASSERT | CS115 | ASSERT | CS115 |

FIG. 10

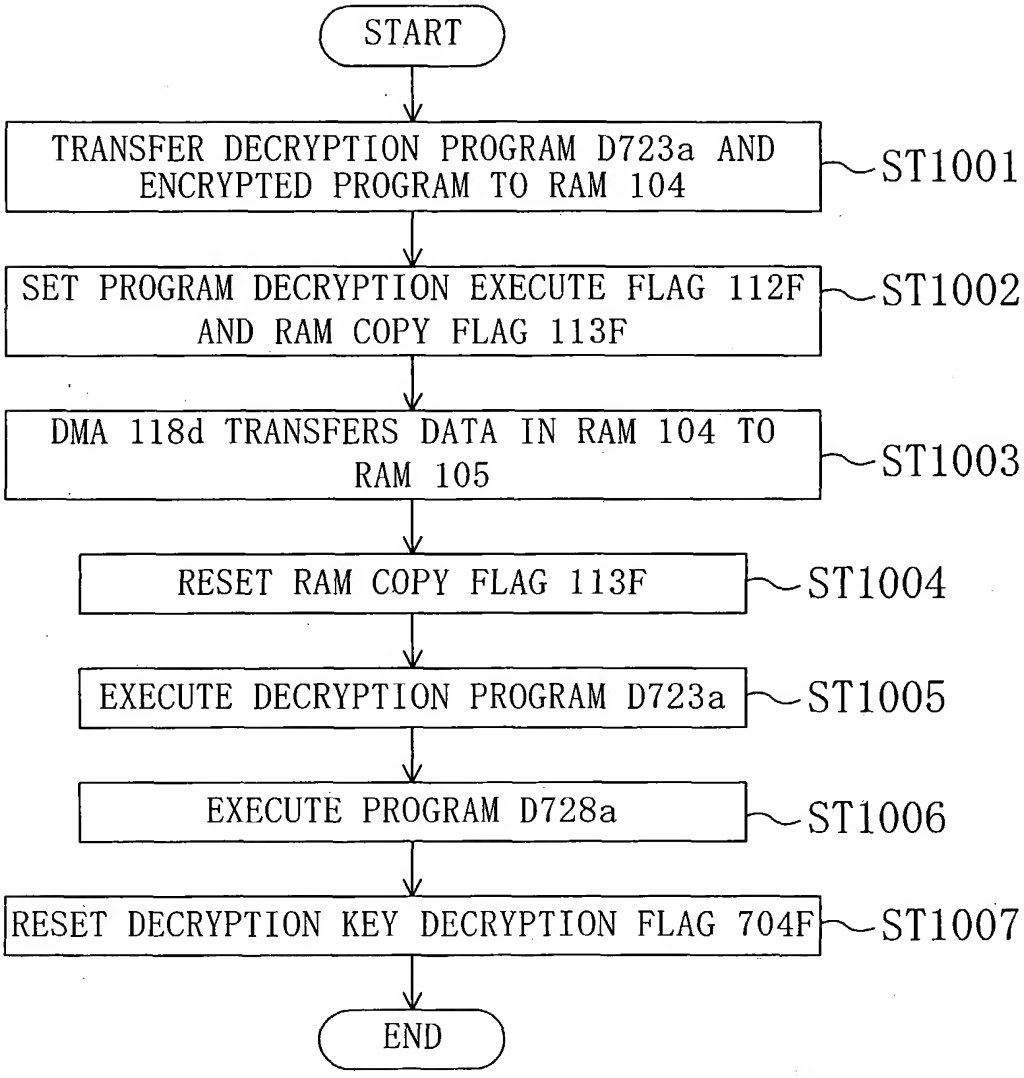

START
TRANSFER DECRYPTION PROGRAM D723a AND ENCRYPTED PROGRAM TO RAM 104
ST1001
SET PROGRAM DECRYPTION EXECUTE FLAG 112F AND RAM COPY FLAG 113F
ST1002
DMA 118d TRANSFERS DATA IN RAM 104 TO RAM 105
ST1003
RESET RAM COPY FLAG 113F
ST1004
EXECUTE DECRYPTION PROGRAM D723a
ST1005
EXECUTE PROGRAM D728a
ST1006
RESET DECRYPTION KEY DECRYPTION FLAG 704F
ST1007
END

FIG. 11

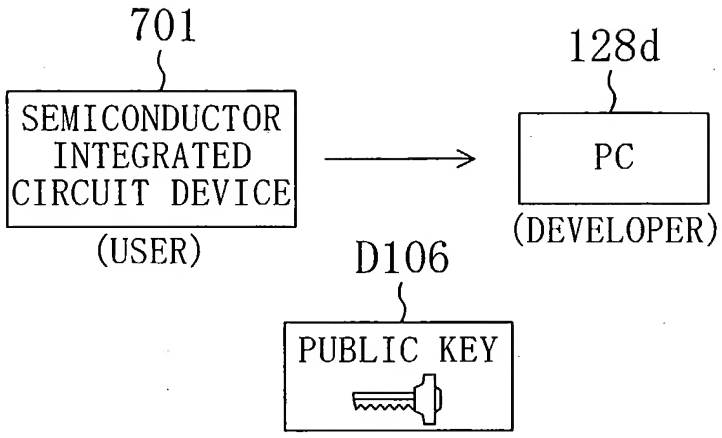

701
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
(USER)
128d
PC
(DEVELOPER)
D106
PUBLIC KEY

FIG. 12

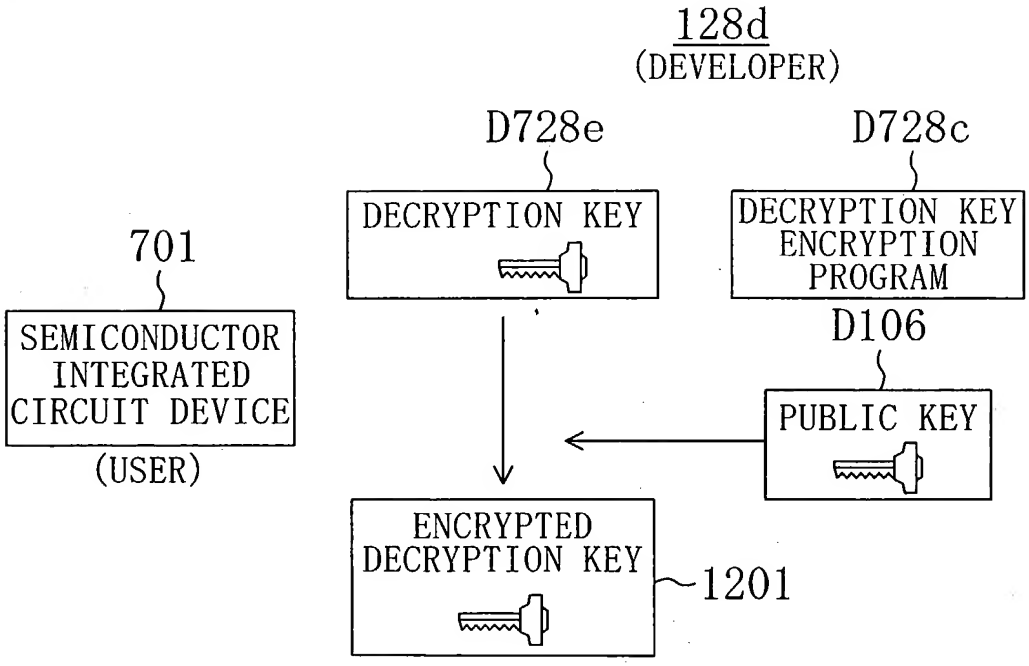

128d
(DEVELOPER)
D728e
DECRYPTION KEY
D728c
DECRYPTION KEY ENCRYPTION PROGRAM
701
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
(USER)
D106
PUBLIC KEY
ENCRYPTED DECRYPTION KEY
1201

FIG. 13

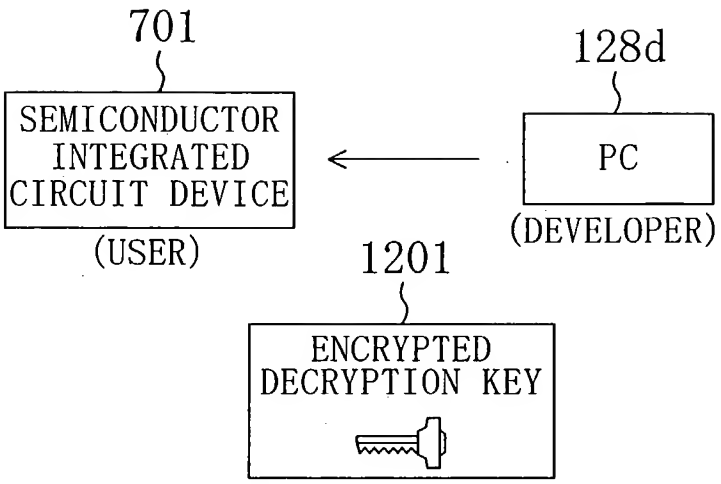

701
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
(USER)
128d
PC
(DEVELOPER)
1201
ENCRYPTED DECRYPTION KEY

FIG. 14

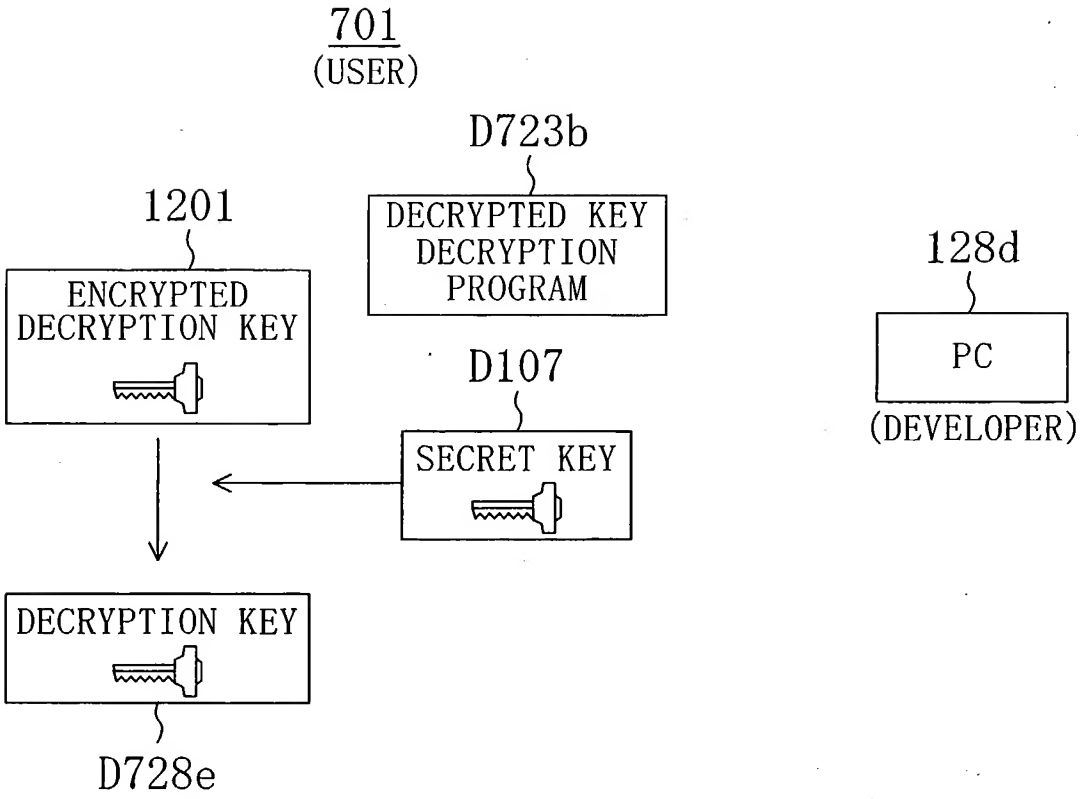

701
(USER)
D723b
DECRYPTED KEY DECRYPTION PROGRAM
1201
ENCRYPTED DECRYPTION KEY
D107
SECRET KEY
128d
PC
(DEVELOPER)
DECRYPTION KEY
D728e

FIG. 15

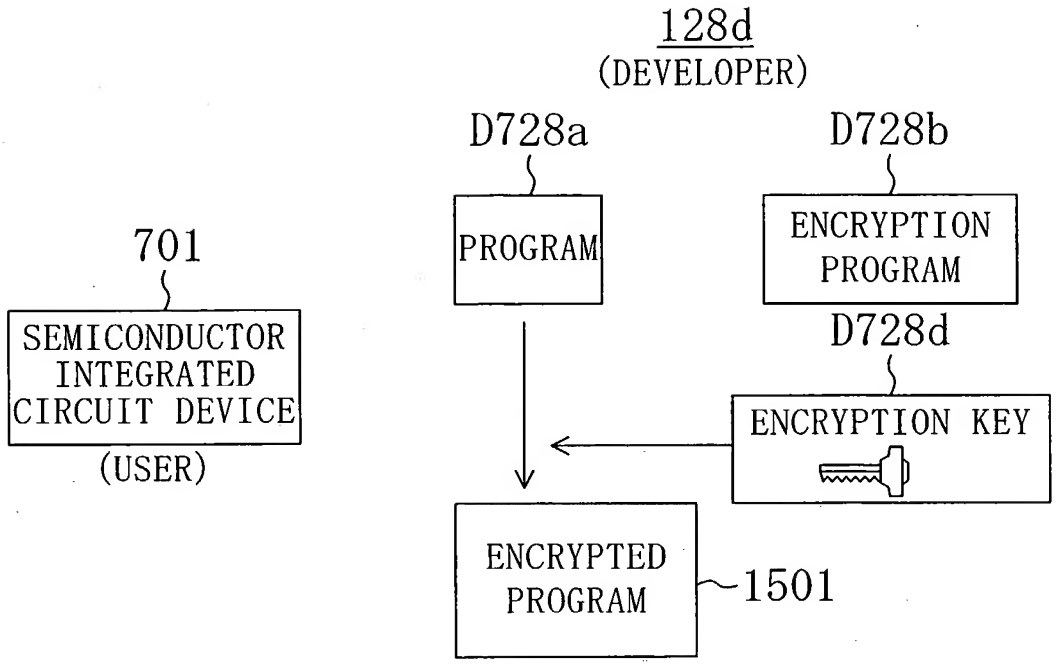

128d
(DEVELOPER)
D728a
D728b
PROGRAM
ENCRYPTION PROGRAM
701
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
(USER)
D728d
ENCRYPTION KEY
ENCRYPTED PROGRAM
1501

FIG. 16

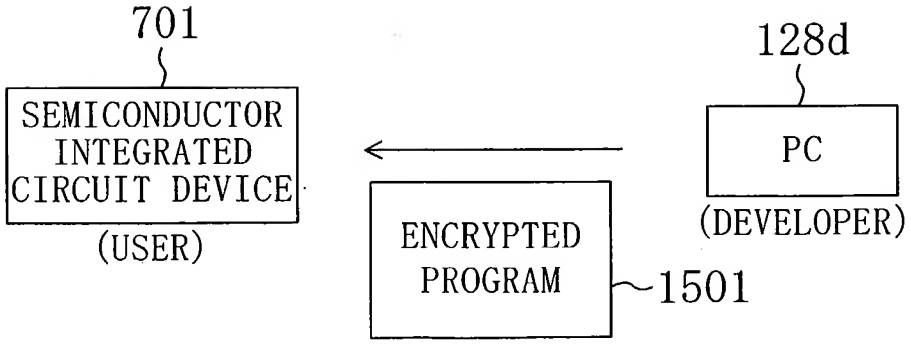
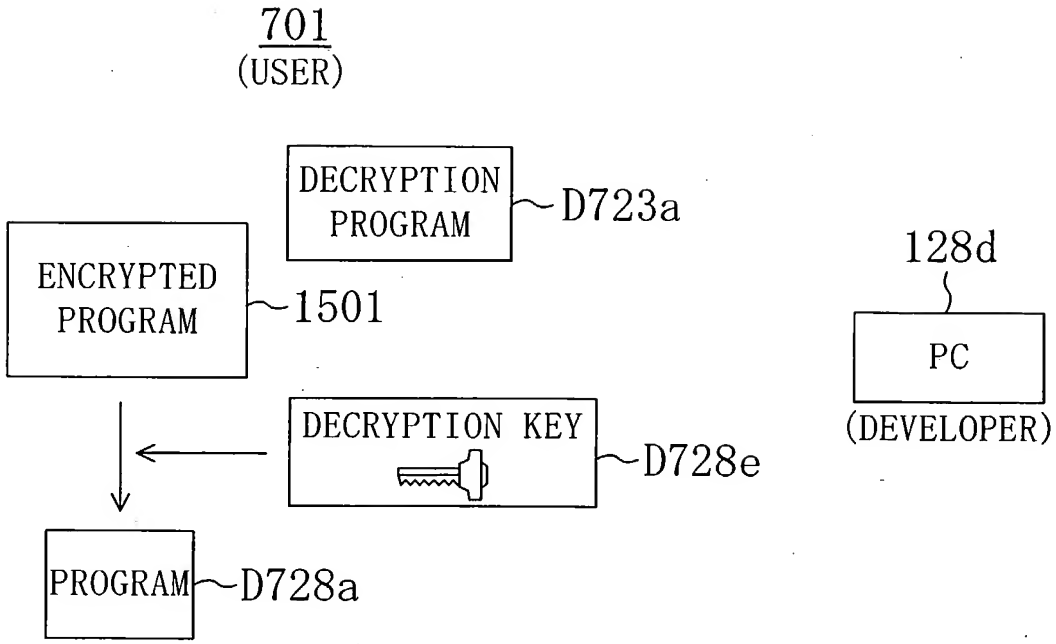

701
SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE
(USER)
128d
PC
(DEVELOPER)
ENCRYPTED PROGRAM
1501

FIG. 17


701
(USER)
DECRYPTION PROGRAM
D723a
ENCRYPTED PROGRAM
1501
128d
PC
(DEVELOPER)
DECRYPTION KEY
D728e
PROGRAM
D728a

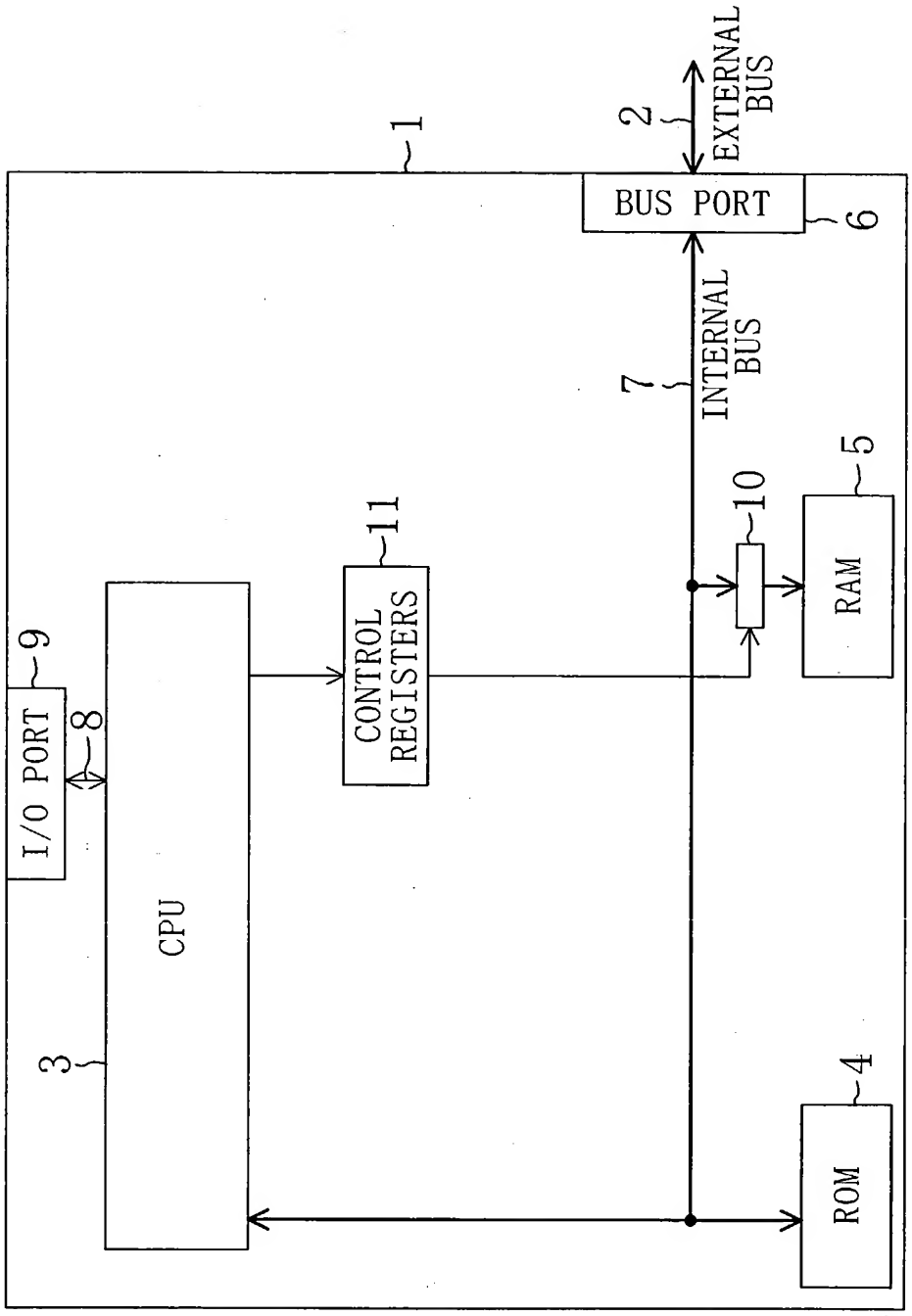



FIG. 18
PRIOR ART